

PENT COOPERATION TREATY

From the INTERNATIONAL BUREAU

PCT

NOTIFICATION OF ELECTION

(PCT Rule 61.2)

To:

Assistant Commissioner for Patents
 United States Patent and Trademark
 Office
 Box PCT
 Washington, D.C.20231
 ETATS-UNIS D'AMERIQUE

Date of mailing (day/month/year)
 26 May 2000 (26.05.00)

in its capacity as elected Office

International application No.
 PCT/GB99/02710

Applicant's or agent's file reference
 RL-P50719PC

International filing date (day/month/year)
 16 August 1999 (16.08.99)

Priority date (day/month/year)
 24 August 1998 (24.08.98)

Applicant

PIETRAS, Bernd-Georg

1. The designated Office is hereby notified of its election made:

in the demand filed with the International Preliminary Examining Authority on:

16 March 2000 (16.03.00)

in a notice effecting later election filed with the International Bureau on:

2. The election was

was not

made before the expiration of 19 months from the priority date or, where Rule 32 applies, within the time limit under Rule 32.2(b).

The International Bureau of WIPO
 34, chemin des Colombettes
 1211 Geneva 20, Switzerland

Authorized officer

Juan Cruz

Facsimile No.: (41-22) 740.14.35

Telephone No.: (41-22) 338.83.38

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TENT COOPERATION TRE

From the INTERNATIONAL BUREAU

PCT

NOTIFICATION OF THE RECORDING
OF A CHANGE(PCT Rule 92bis.1 and
Administrative Instructions, Section 422)Date of mailing (day/month/year)
29 May 2000 (29.05.00)To:
LIND, Robert
Marks & Clerk
4220 Nash Court
Oxford Business Park South
Oxford OX4 2RU
ROYAUME-UNIApplicant's or agent's file reference
RL-P50719PC

IMPORTANT NOTIFICATION

International application No.
PCT/GB99/02710International filing date (day/month/year)
16 August 1999 (16.08.99)

1. The following indications appeared on record concerning:

 the applicant the inventor the agent the common representativeName and Address
WEATHERFORD/LAMB, INC.
c/o CSC - The United States
Corporation Company
1013 Centre Road
Wilmington, DE 19805
United States of AmericaState of Nationality
USState of Residence
US

Telephone No.

Facsimile No.

Teleprinter No.

2. The International Bureau hereby notifies the applicant that the following change has been recorded concerning:

 the person the name the address the nationality the residenceName and Address
WEATHERFORD/LAMB, INC.
515 Post Oak Blvd. Suite 600
Houston Tx 77027
United States of AmericaState of Nationality
USState of Residence
US

Telephone No.

Facsimile No.

Teleprinter No.

3. Further observations, if necessary:

4. A copy of this notification has been sent to:

 the receiving Office the designated Offices concerned the International Searching Authority the elected Offices concerned the International Preliminary Examining Authority other:The International Bureau of WIPO
34, chemin des Colombettes
1211 Geneva 20, Switzerland

Authorized officer

Juan Cruz

Facsimile No.: (41-22) 740.14.35

Telephone No.: (41-22) 338.83.38

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PCT

WORLD INTELLECTUAL PROPERTY ORGANIZATION
International Bureau



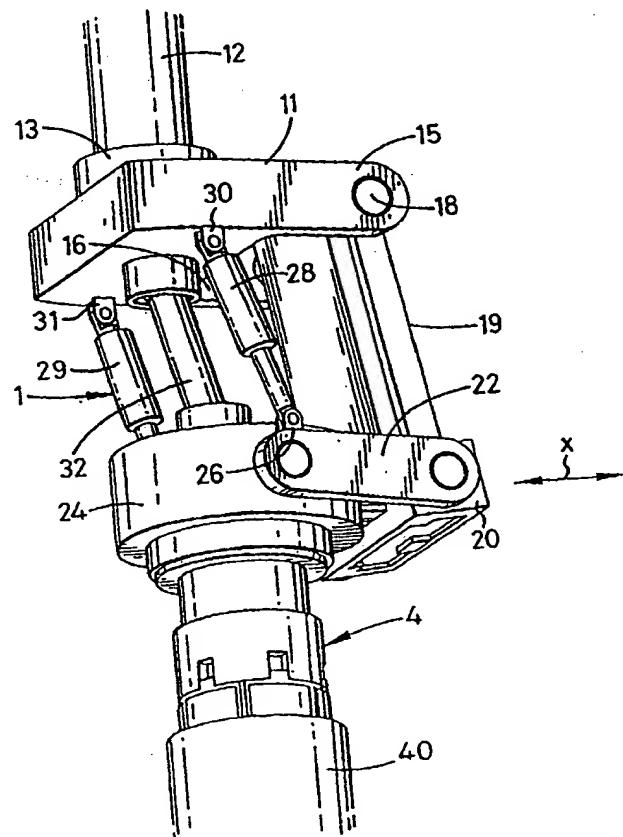
INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification 7 : E21B 19/16	A1	(11) International Publication Number: WO 00/11311 (43) International Publication Date: 2 March 2000 (02.03.00)
(21) International Application Number: PCT/GB99/02710		(81) Designated States: AU, CA, GB, NO, US, European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE).
(22) International Filing Date: 16 August 1999 (16.08.99)		
(30) Priority Data: 9818363.5 24 August 1998 (24.08.98) GB		Published <i>With international search report.</i>
(71) Applicant (for all designated States except US): WEATHERFORD/LAMB, INC. [US/US]; c/o CSC – The United States Corporation Company, 1013 Centre Road, Wilmington, DE 19805 (US).		
(71) Applicant (for GB only): HARDING, Richard, Patrick [GB/GB]; Marks & Clerk, 4220 Nash Court, Oxford Business Park South, Oxford OX4 2RU (GB).		
(72) Inventor; and		
(75) Inventor/Applicant (for US only): PIETRAS, Bernd-Georg [DE/DE]; Sandriedeweg 12, D-30900 Wedemark (DE).		
(74) Agent: LIND, Robert; Marks & Clerk, 4220 Nash Court, Oxford Business Park South, Oxford OX4 2RU (GB).		

(54) Title: METHODS AND APPARATUS FOR CONNECTING TUBULARS USING A TOP DRIVE

(57) Abstract

An apparatus for facilitating the connection of tubulars using a top drive (3), the apparatus comprising a stator (11) attachable to said top drive (3), and a supporting member (24) for supporting a tool (4), wherein means (1) are provided to allow substantially horizontal movement of said supporting member (24).



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FOR THE PURPOSES OF INFORMATION ONLY

Codes used to identify States party to the PCT on the front pages of pamphlets publishing international applications under the PCT.

AL	Albania	ES	Spain	LS	Lesotho	SI	Slovenia
AM	Armenia	FI	Finland	LT	Lithuania	SK	Slovakia
AT	Austria	FR	France	LU	Luxembourg	SN	Senegal
AU	Australia	GA	Gabon	LV	Latvia	SZ	Swaziland
AZ	Azerbaijan	GB	United Kingdom	MC	Monaco	TD	Chad
BA	Bosnia and Herzegovina	GE	Georgia	MD	Republic of Moldova	TG	Togo
BB	Barbados	GH	Ghana	MG	Madagascar	TJ	Tajikistan
BE	Belgium	GN	Guinea	MK	The former Yugoslav Republic of Macedonia	TM	Turkmenistan
BF	Burkina Faso	GR	Greece	ML	Mali	TR	Turkey
BG	Bulgaria	HU	Hungary	MN	Mongolia	TT	Trinidad and Tobago
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BR	Brazil	IL	Israel	MW	Malawi	UG	Uganda
BY	Belarus	IS	Iceland	MX	Mexico	US	United States of America
CA	Canada	IT	Italy	NE	Niger	UZ	Uzbekistan
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DK	Denmark	LR	Liberia	SG	Singapore		
EE	Estonia						

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INTERNATIONAL SEARCH REPORT

International Application No

PL/GB 99/02710

A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 E21B19/16

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 E21B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 4 878 546 A (SHAW DANIAL G ET AL) 7 November 1989 (1989-11-07) abstract figures 1-4 ---	1, 14
A	WO 98 32948 A (PIETRAS BERND GEORG ;LUCAS BRIAN RONALD (GB); WEATHERFORD LAMB (US) 30 July 1998 (1998-07-30) abstract -----	1, 14

Further documents are listed in the continuation of box C.

Patent family members are listed in annex.

Special categories of cited documents :

- "A" document defining the general state of the art which is not considered to be of particular relevance
- "E" earlier document but published on or after the international filing date
- "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- "O" document referring to an oral disclosure, use, exhibition or other means
- "P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

Date of the actual completion of the international search

19. November 1999

Date of mailing of the international search report

26/11/1999

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl
Fax: (+31-70) 340-3016

Authorized officer

Schouten, A

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INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/GB 99/02710

Patent document cited in search report	Publication date	Patent family member(s)			Publication date
US 4878546	A 07-11-1989	NONE			
WO 9832948	A 30-07-1998	AU 5872898 A	NO 993498 A	18-08-1998 30-08-1999	

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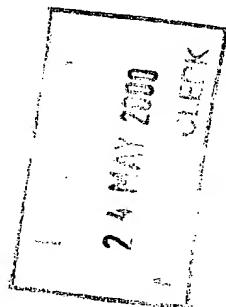
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PATENT COOPERATION TREATY

From the
INTERNATIONAL PRELIMINARY EXAMINING AUTHORITY

To:

LIND, Robert
MARKS & CLERK
4220 Nash Court
Oxford Business Park South
Oxford OX4 2RU
GRANDE BRETAGNE



PCT

NOTIFICATION OF TRANSMITTAL OF THE INTERNATIONAL PRELIMINARY EXAMINATION REPORT (PCT Rule 71.1)

Date of mailing
(day/month/year) 22.05.2000

Applicant's or agent's file reference
RL-P50719PC

IMPORTANT NOTIFICATION

International application No.
PCT/GB99/02710

International filing date (day/month/year)
16/08/1999

Priority date (day/month/year)
24/08/1998

Applicant
WEATHERFORD/LAMB, INC. et al.

1. The applicant is hereby notified that this International Preliminary Examining Authority transmits herewith the international preliminary examination report and its annexes, if any, established on the international application.
2. A copy of the report and its annexes, if any, is being transmitted to the International Bureau for communication to all the elected Offices.
3. Where required by any of the elected Offices, the International Bureau will prepare an English translation of the report (but not of any annexes) and will transmit such translation to those Offices.

4. REMINDER

The applicant must enter the national phase before each elected Office by performing certain acts (filing translations and paying national fees) within 30 months from the priority date (or later in some Offices) (Article 39(1)) (see also the reminder sent by the International Bureau with Form PCT/IB/301).

Where a translation of the international application must be furnished to an elected Office, that translation must contain a translation of any annexes to the international preliminary examination report. It is the applicant's responsibility to prepare and furnish such translation directly to each elected Office concerned.

For further details on the applicable time limits and requirements of the elected Offices, see Volume II of the PCT Applicant's Guide.

Name and mailing address of the IPEA/



European Patent Office
D-80298 Munich
Tel. +49 89 2399 - 0 Tx: 523656 epmu d
Fax: +49 89 2399 - 4465

Authorized officer

Emer, W

Tel. +49 89 2399-2972



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PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT
(PCT Article 36 and Rule 70)

Applicant's or agent's file reference RL-P50719PC	FOR FURTHER ACTION	See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)
International application No. PCT/GB99/02710	International filing date (day/month/year) 16/08/1999	Priority date (day/month/year) 24/08/1998
International Patent Classification (IPC) or national classification and IPC E21B19/16		
<p>Applicant WEATHERFORD/LAMB, INC. et al.</p> <p>1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.</p> <p>2. This REPORT consists of a total of 5 sheets, including this cover sheet.</p> <p><input type="checkbox"/> This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).</p> <p>These annexes consist of a total of sheets.</p> <p>3. This report contains indications relating to the following items:</p> <ul style="list-style-type: none"> I <input checked="" type="checkbox"/> Basis of the report II <input type="checkbox"/> Priority III <input type="checkbox"/> Non-establishment of opinion with regard to novelty, inventive step and industrial applicability IV <input type="checkbox"/> Lack of unity of invention V <input checked="" type="checkbox"/> Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement VI <input type="checkbox"/> Certain documents cited VII <input checked="" type="checkbox"/> Certain defects in the international application VIII <input type="checkbox"/> Certain observations on the international application 		

Date of submission of the demand 16/03/2000	Date of completion of this report 22.05.2000
Name and mailing address of the international preliminary examining authority: European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465	Authorized officer Crossley, M Telephone No. +49 89 2399 2319



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INTERNATIONAL PRELIMINARY
EXAMINATION REPORT

International application No. PCT/GB99/02710

I. Basis of the report

1. This report has been drawn on the basis of (*substitute sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to the report since they do not contain amendments.*):

Description, pages:

1-7 as originally filed

Claims, No.:

1-14 as originally filed

Drawings, sheets:

1/7-7/7 as originally filed

2. The amendments have resulted in the cancellation of:

the description, pages:
 the claims, Nos.:
 the drawings, sheets:

3. This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)):

4. Additional observations, if necessary:

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**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT**

International application No. PCT/GB99/02710

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes:	Claims 1-14
	No:	Claims
Inventive step (IS)	Yes:	Claims 1-14
	No:	Claims
Industrial applicability (IA)	Yes:	Claims 1-14
	No:	Claims

2. Citations and explanations

see separate sheet

VII. Certain defects in the international application

The following defects in the form or contents of the international application have been noted:

see separate sheet

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INTERNATIONAL PRELIMINARY
EXAMINATION REPORT - SEPARATE SHEET

International application No. PCT/GB99/02710

SECTION V -----

Concerning independent Claims 1 & 14:

N: None of the available prior art documents disclose the specific combination of features as claimed.

Therefore, independent claims 1 & 14 appear to satisfy Art.33(2).

IS: The inventive concept concerns the provision of a means of enabling horizontal movement of the supporting member (24), so that manufacturing tolerances in tubular alignment can be overcome. Since, it is often the case that the tubular does not align itself with the other corresponding tubular end held in the spider element.

Such an arrangement facilitates greater ease of connection of two tubular ends using a top drive and in particular the connection of a section of casing to a string of casing.

In consequence, the subject-matter of independent claims 1 & 14 are considered to involve an inventive step (Art.33(3)).

IA: The industrial applicability of the apparatus is apparent and thereby satisfies Article 33(4).

Concerning Claims 2-13:

Dependent claims 2-13 concern particular further refinements to independent claim 1, and as such, also meet the requirements of Art.33(2,3,4).

* * *

SECTION VII -----

1. 'Independent apparatus claim 1 should have been placed in the appropriate two-part form in accordance with Rule 6.3(b), with those features known in combi-

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INTERNATIONAL PRELIMINARY
EXAMINATION REPORT - SEPARATE SHEET

International application No. PCT/GB99/02710

nation from the most relevant prior art - chosen either from the present Search Report or from the Applicant's own knowledge - having been placed in a preamble portion (Rule 6.3(b)(i)) with the remaining features having been placed in a characterising portion (Rule 6.3(b)(ii)).

2. The features of all of the claims should be provided with reference signs placed in parentheses (Rule 6.2(b)) - cf. claim 14.
3. For reasons of clarity, it is believed that the wording at the beginning of claim 2 regarding "or 2" should have been deleted (Art.6).

Description:

4. In the interests of clarity and support in the description (Article 6), the wording on page 2 should be amended to reflect the exact wording of any new independent claims and to meet the requirements of Rule 5.1 (a)(i-ii), a nominated document should be identified in the description **as that showing the preamble features of the independent claim(s) as appropriate** and the relevant background art disclosed therein should be briefly discussed.

* * * * *

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PATENT COOPERATION TREATY

From the FILING OFFICE

PCT

To:
 Marks & Clerk
 4220 Nash Court
 Oxford Business Park South
 Oxford
 OX4 2RU

NOTIFICATION OF THE INTERNATIONAL APPLICATION NUMBER AND OF THE INTERNATIONAL FILING DATE

(PCT Rule 20.5(c))

Date of mailing (day/month/year)	02 SEP 1999
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Applicant's or agent's file reference RL.P50719PC	IMPORTANT NOTIFICATION	
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International application No. PCT/GB99/02710	International filing date (day/month/year) 16/08/1999	Priority date (day/month/year) 24/08/1998
---	--	--

Applicant Weatherford/Lamb, Inc. et al

Title of the invention Method And Apparatus For Facilitating The Connection Of Tubulars Using A Top Drive
--

1. The applicant is hereby notified that the international application has been accorded the international application number and the international filing date indicated above.

2. The applicant is further notified that the record copy of the international application:



was transmitted to the International Bureau on _____

02 SEP 1999



has not yet been transmitted to the International Bureau for the reason indicated below and a copy of this notification has been sent to the International Bureau*:



because the necessary national security clearance has not yet been obtained.



because (reason to be specified):

* The International Bureau monitors the transmittal of the record copy by the receiving Office and will notify the applicant (with Form PCT/IB/301) of its receipt. Should the record copy not have been received by the expiration of 14 months from the priority date, the International Bureau will notify the applicant (Rule 22.1(c)).

Name and mailing address of the receiving Office The Patent Office Cardiff Road, Newport South Wales NP9 1RH	Authorized officer Karen Mitchell Telephone No. 01633 814384
Facsimile No.	

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PATENT COOPERATION TREATY

PCT

INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference RL-P50719PC	FOR FURTHER ACTION see Notification of Transmittal of International Search Report (Form PCT/ISA/220) as well as, where applicable, item 5 below.	
International application No. PCT/GB 99/02710	International filing date (day/month/year) 16/08/1999	(Earliest) Priority Date (day/month/year) 24/08/1998
Applicant WEATHERFORD/LAMB, INC. et al.		

This International Search Report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This International Search Report consists of a total of 2 sheets.

It is also accompanied by a copy of each prior art document cited in this report.

1. **Basis of the report**

a. With regard to the **language**, the international search was carried out on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.

the international search was carried out on the basis of a translation of the international application furnished to this Authority (Rule 23.1(b)).

b. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international search was carried out on the basis of the sequence listing :

contained in the international application in written form.

filed together with the international application in computer readable form.

furnished subsequently to this Authority in written form.

furnished subsequently to this Authority in computer readable form.

the statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.

the statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished

2. **Certain claims were found unsearchable** (See Box I).

3. **Unity of invention is lacking** (see Box II).

4. With regard to the **title**,

the text is approved as submitted by the applicant.

the text has been established by this Authority to read as follows:

METHODS AND APPARATUS FOR CONNECTING TUBULARS USING A TOP DRIVE

5. With regard to the **abstract**,

the text is approved as submitted by the applicant.

the text has been established, according to Rule 38.2(b), by this Authority as it appears in Box III. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.

6. The figure of the **drawings** to be published with the abstract is Figure No.

as suggested by the applicant.

because the applicant failed to suggest a figure.

because this figure better characterizes the invention.

4

None of the figures.

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INTERNATIONAL SEARCH REPORT

International Application No

PCT/GB 99/02710

A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 E21B19/16

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 E21B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 4 878 546 A (SHAW DANIAL G ET AL) 7 November 1989 (1989-11-07) abstract figures 1-4 ----	1, 14
A	WO 98 32948 A (PIETRAS BERND GEORG ;LUCAS BRIAN RONALD (GB); WEATHERFORD LAMB (US) 30 July 1998 (1998-07-30) abstract -----	1, 14

 Further documents are listed in the continuation of box C. Patent family members are listed in annex.

° Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"E" earlier document but published on or after the international filing date

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"O" document referring to an oral disclosure, use, exhibition or other means

"Z" document member of the same patent family

"P" document published prior to the international filing date but later than the priority date claimed

Date of the actual completion of the international search

Date of mailing of the international search report

19 November 1999

26/11/1999

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,
Fax: (+31-70) 340-3016

Authorized officer

Schouten, A

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INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/GB 99/02710

Patent document cited in search report	Publication date	Patent family member(s)		Publication date
US 4878546	A 07-11-1989	NONE		
WO 9832948	A 30-07-1998	AU 5872898 A	18-08-1998	
		NO 993498 A	30-08-1999	

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PCT

WORLD INTELLECTUAL PROPERTY ORGANIZATION
International Bureau



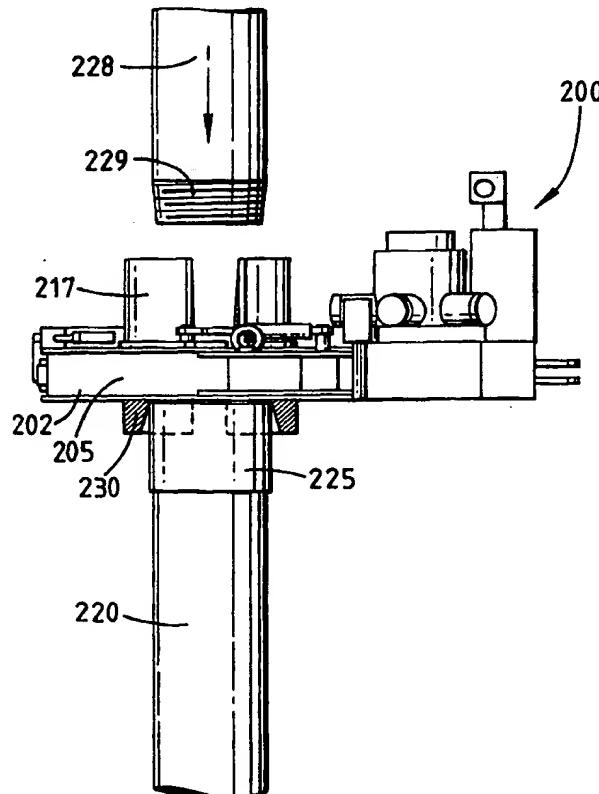
INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification 6 : E21B 19/16		A1	(11) International Publication Number: WO 98/32948 (43) International Publication Date: 30 July 1998 (30.07.98)
(21) International Application Number: PCT/GB98/00282		(81) Designated States: AU, CA, CN, JP, NO, US, European patent (AT, BE, CH, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE).	
(22) International Filing Date: 29 January 1998 (29.01.98)			
(30) Priority Data: 9701758.6 29 January 1997 (29.01.97) GB		Published <i>With international search report.</i>	
(71) Applicants (for all designated States except US): WEATHERFORD/LAMB, INC. [US/US]; c/o CSC-The United States Corporation Company, 1013 Centre Road, Wilmington, DE 19805 (US). LUCAS, Brian, Ronald [GB/GB]; 135 Westhall Road, Warlingham, Surrey CR6 9HJ (GB).			
(72) Inventor; and (75) Inventor/Applicant (for US only): PIETRAS, Bernd-Georg [DE/DE]; Sandriedeweg 12, D-30900 Wedemark (DE).			
(74) Agent: LUCAS, Brian, Ronald; Lucas & Co., 135 Westhall Road, Warlingham, Surrey CR6 9HJ (GB).			

(54) Title: APPARATUS AND METHOD FOR ALIGNING TUBULARS

(57) Abstract

An apparatus for aligning tubulars comprises a guide (217) and a socket centralizer (230) which are mounted on opposite sides of a power tong (202). In use, the power tong (202) is lowered so that the socket centralizer (230) lies circumjacent the socket (215) of a lower length of casing (220) and an upper length of casing (228) is lowered so that its pin (229) is brought into alignment with the socket (225) by the guide (217). The power tong (202) is then raised and the jaw assemblies applied to grip the upper length of casing (228) which is then rotated to screw the pin (229) into the socket (225) and make up the joint to the required torque.



FOR THE PURPOSES OF INFORMATION ONLY

Codes used to identify States party to the PCT on the front pages of pamphlets publishing international applications under the PCT.

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AM	Armenia	FI	Finland	LT	Lithuania	SK	Slovakia
AT	Austria	FR	France	LU	Luxembourg	SN	Senegal
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APPARATUS AND METHOD FOR ALIGNING TUBULARS

This invention relates to an apparatus and a method for aligning tubulars.

During the construction, maintenance and repair of oil and gas wells it is necessary to connect a large number of tubulars, for example lengths of drill pipe and casing. Conventionally the upper end of a tubular is provided with a threaded socket whilst the lower end is provided with a threaded pin which is slightly tapered.

In practice it is very easy for the pin of one tubular to be incorrectly inserted into the socket of an adjacent tubular with the result that the threads on one or both the pin and the socket can readily be damaged.

Considerable skill is required to correctly align tubulars and historically this task has been undertaken by a highly experienced rig-hand called a "stabber".

In order to facilitate correct alignment a device known as a "stabbing guide" is frequently used. One such stabbing guide comprises a plastic body member which can be mounted on the socket of a pipe held in slips. The plastic body member has a central passageway the upper part of which defines a funnel which leads into a lower passageway which is concentric with the socket. In use, as the upper tubular is lowered, its pin enters the funnel of the stabbing guide and then travels down the lower passageway into the socket. The stabbing guide (which comprises two semi-circular pieces hinged together around the socket) is then removed and the tubulars are screwed together and tightened to the required torque either by a power tong or a tong assembly comprising a power tong and a backup tong.

In order to simplify the stabbing operation the present invention provides an apparatus for aligning tubulars which apparatus comprises a guide mounted on

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one of a power tong and a backup tong.

In one embodiment said apparatus further comprises a socket centralizer mounted on said one of said power tong and said backup tong.

5 Preferably, said one of said power tong and said backup tong is said power tong.

In another embodiment, said apparatus comprises a power tong and a backup tong, wherein said guide is mounted on said power tong and means are provided to 10 maintain said power tong and said backup tong in a certain juxtaposition during a stabbing operation.

Preferably, said means comprises locating rods on one of said power tong and said backup tong and blocks shaped to receive at least the ends of said locating 15 rods on the other of said power tong and said backup tong.

Advantageously, said backup tong is provided with at least two prismatic jaw assemblies to locate said backup tong in fixed juxtaposition with respect to a 20 tubular being gripped.

The present invention also provides methods for aligning tubulars as set out in Claims 7 and 8 hereto.

* * *

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For a better understanding of the present invention reference will now be made, by way of example, to the accompanying drawings, in which:-

5 Figure 1a is a side elevation of a conventional tong assembly;

Figure 1b is a top plan view of the tong assembly shown in Fig. 1a;

10 Figure 2a is a side elevation of a first embodiment of an apparatus in accordance with the present invention;

Figure 2b is a top plan view of the apparatus shown in Fig. 2a;

15 Figure 3a is a side view of the components of a guide forming part of the apparatus shown in Figs. 2a and 2b;

Figure 3b is a top plan view of the guide shown in Fig. 3a;

Figure 3c is a section on line IIIc-IIIc of Fig. 3b;

20 Figure 4 is a top plan view of the backup tong forming part of the apparatus shown in Figs. 2a and 2b with certain parts removed for clarity;

Figure 5 is a side elevation of the apparatus shown in Figs. 2a and 2b in a first position;

25 Figure 6 is a side elevation of the apparatus shown in Figs. 2a and 2b in a second position;

Figure 7 is a side elevation of the apparatus shown in Figs. 2a and 2b in a third position;

30 Figure 8 is a side elevation of the apparatus shown in Figs. 2a and 2b in a fourth position;

Figure 9 is a side elevation of the apparatus shown in Figs. 2a and 2b in a fifth position;

35 Figure 10 is a side elevation of a second embodiment of an apparatus in accordance with the present invention;

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Figure 11 is a side elevation of a third embodiment of an apparatus in accordance with the present invention; and

5 Figure 12 is a perspective view of a fourth embodiment of an apparatus in accordance with the present invention.

Referring to Figures 1a and 1b of the drawings there is shown a conventional tong assembly which is generally identified by the reference numeral 1.

10 The tong assembly 1 comprises a power tong 2 and a backup tong 3.

The power tong 2 comprises a pair of gates 4, 5 which are held together in the position shown by latch 6. When the latch 6 is released the gates 4, 5 can be 15 swung open by admitting hydraulic fluid to piston and cylinder assemblies 7 and 8. The power tong 2 also contains a rotary 9 which is provided with four jaw assemblies 10. The rotary 9 can be rotated by a hydraulic motor 11.

20 The backup tong 3 is provided with two gates 12, 13 which are held together by latch 14 but which, when latch 14 is released can be swung to an open position.

In use, a lower length of casing (not shown), the upper end of which is provided with a socket, is gripped 25 by slips. A stabbing guide is mounted on the socket and the pin of an upper length of casing is lowered into the stabbing guide.

Once the pin is correctly located the stabbing guide is removed. The gates 4, 5 of the power tong 2 and 30 the gates 12, 13 of the backup tong 3 are then opened and the tong assembly 1 moved towards the casing until the lower length of casing lies within the backup tong 3 and the upper length of casing lies within the power tong 2. The gates 4, 5, 12, 13 are then closed and 35 latched. Jaw assemblies in the backup tong are then

advanced to engage the lower length of casing whilst jaw assemblies in the power tong 2 are advanced to grip the upper length of casing. The hydraulic motor 11 is then actuated to turn the rotary 9 and rotate the upper 5 length of casing relative to the lower length of casing. The tong assembly 1 is supported by a pneumatic lifting cylinder 15 which enables the power tong 2 to move towards the backup tong 3 as the pin enters the socket. Reaction forces are transmitted by columns 16 disposed 10 to either side of the tong assembly 1 and by a series of levers in a known manner. It should be noted that the power tong 2 is free to move in a plane parallel to the backup tong 3 within certain limits.

Referring now to Figures 2a and 2b there is shown 15 an apparatus in accordance with the present invention which is generally identified by the reference numeral 100.

The apparatus 100 comprises a tong assembly 101 which is generally similar to the tong assembly 1 shown 20 in Figs. 1a and 1b and parts of the tong assembly 101 similar to the tong assembly 1 have been identified by similar reference numerals in the "100" series.

The main differences are that:-

1. The top of the power tong 102 is provided with 25 a guide 117;

2. The backup tong 103 is provided with jaw assemblies for accurately positioning the lower casing with respect to the backup tong 103; and

30 3. Means are provided for accurately aligning the power tong 102 with respect to the backup tong 103 and hence the guide 117 with the lower casing.

Turning firstly to the guide 117 it will be seen from Fig. 3 that this comprises four identical components 118 which are bolted to the top of the power tong 35 102. As best shown in Fig. 3c each component is tapered

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so as to guide the pin of an upper casing to the centre of the opening of the power tong 102.

Referring now to Figure 4, the backup tong 103 is provided with three prismatic jaw assemblies 119a, 119b and 119c which, when actuated, hold a lower length of casing 120 in a fixed position relative to the backup tong 103.

As shown in Figure 5 the backup tong 3 is provided with three upwardly extending locating rods 121 which are each provided with a conical tip 122. Similar, the underside of the power tong 102 is provided with three blocks 123 each of which is provided with a recess 124 shaped to receive the conical tip 122 of a respective locating rod 121.

In use, the lower length of casing 120 is first secured by slips on the rig floor in the usual manner. The gates 112 and 113 of the backup tong 103 are then opened and the tong assembly 101 moved into position with the backup tong 103 circumjacent the lower length of casing 120 and immediately below the socket 125 thereof.

The gates 112 and 113 are then closed by hydraulic piston and cylinder assemblies 126 and 127 and the latch 114 closed. The prismatic jaw assembly 119a is fixed whilst prismatic jaw assemblies 119b and 119c are automatically advanced by a predetermined distance when the latch 114 is closed. This grips the lower length of casing firmly and also ensures that the backup tong 3 is in a fixed position relative to the lower length of casing 120. The position thusfar attained is shown in Fig. 5.

At this time pneumatic lifting cylinder 115 is extended which lowers the backup tong 3. The conical tips 122 of the locating rods 121 enter the recesses 124 of the blocks 123 and thus locate the power tong 2 with

respect to the backup tong 3. This in turn locates the guide 117 with respect to the lower length of casing 120 so that the centre of the guide 117 is coaxial with the axis of the lower length of casing 120. This position 5 is shown in Fig. 6.

At this time the upper length of casing 128 is lowered into the proximity of the guide 117. As shown in Fig. 7 the lower end of the upper length of casing 128 is provided with a pin 129 which is tapered.

10 As the upper length of casing 128 is further lowered the pin 129 enters the guide 117 and is centred thereby. It then passes downwardly until it enters the socket 125 as shown in Fig. 8.

15 The power tong 102 is then raised so that the blocks 123 are well clear of the locating rods 121. At this point the jaw assemblies in the power tong 102 are applied to the upper length of casing 128 and the hydraulic motor 111 actuated to rotate the rotary and screw the pin 129 into the socket 125. During the 20 procedure the power tong 102 moves towards the backup tong 103. However, even when the joint is tightened to the required torque the blocks 123 still lie a short distance above the conical tips 122 of the locating rods 121.

25 At this stage the jaw assemblies of both the power tong 102 and the backup tong 103 are relaxed, the gates 104, 105, 112 and 113 opened and the tong assembly 101 retracted in preparation for the casing being lowered. It will be noted that one component 118 of the guide 117 30 is mounted on each of the gates 104, 105 and accordingly the guide 117 opens and closes with the gates 104, 105.

35 For certain applications a backup tong is not required, for example where the power tong can conveniently be restrained by a chain attached to the drilling tower.

Figure 10 shows an apparatus in accordance with the present invention which is generally identified by the reference numeral 200.

5 The apparatus 200 comprises a power tong 202 which is generally similar to the power tong 2. The basic construction of the power tong 202 is similar to the power tong 2 and parts having similar functions have been identified by the same reference numeral in the "200" series.

10 The main differences are that the apparatus 200 does not include a backup tong and that it is provided with a guide 217 and a socket centraliser 230.

15 In use, the lower length of casing 220 is first secured by slips (not shown) with the socket 225 facing upwardly close to the slips.

The power tong 202 is then lowered onto the socket 225 so that the socket 225 enters the socket centraliser 230 and aligns the socket centraliser 230, the socket 225 and the guide 217.

20 The upper length of casing 228 is then lowered so that its pin 229 enters the guide 217, is centred thereby and enters the socket 225. At this point power tong 202 is raised. Its jaw assemblies are then advanced to grip the upper length of casing 228 which is then rotated to screw the pin 229 into the socket 225.

25 Once the joint is tightened to the required torque the gates 204, 205 are opened and the power tong 202 withdrawn.

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* * *

The embodiment shown in Fig. 11 is generally similar to that shown in Fig. 10 except that the apparatus 300 also includes a backup tong 303.

35 Since the upper length of casing 328 and the lower

length of casing 320 are being aligned by the guide 317 and the socket centraliser 330 no special arrangements need be made for aligning the power tong 302 and the backup tong 303.

5 The procedure for connecting the upper length of casing 328 to the lower length of casing 320 is as follows.

Firstly, the lower length of casing 320 is secured in slip (not shown).

10 The gates 312, 313 of the backup tong are then opened and the apparatus 300 manoeuvred so that the lower length of casing 320 is disposed within the backup tong 303.

15 The power tong 302 is then lowered until the socket 325 on the lower length of casing 320 is received within the socket centraliser 330.

20 The upper length of casing 328 is then lowered until the pin 329 passes through guide 317 and enters the socket 328. Only at this stage are gates 312, 313 closed and the jaw assemblies of the backup tong 303 activated to grip the lower length of casing 320.

25 The power tong 302 is then raised and its jaw assemblies activated to grip the upper length of casing 328 which is then rotated to cause the pin 329 to enter the socket 325 and the joint to be tightened to the desired torque.

The jaw assemblies are then relaxed and the gates 304, 305, 312, 313 of the power tong 302 and the backup tong 303 opened prior to retracting the apparatus 300.

30 Various modifications to the embodiments described are envisaged, for example, if desired, the guide and the socket centraliser could be mounted on the backup tong 303 rather than the power tong 302. Alternatively, the guide could be mounted on the backup tong without a socket centraliser. Such an arrangement is shown in

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Fig. 12.

* * *

5 The embodiment shown in Fig. 12 is generally similar to that shown in Fig. 1a and 1b and parts of the tong assembly 401 similar to the tong assembly 1 have been identified by similar reference numerals in the "400" series.

10 The main difference is that the top of the backup tong 403 is provided with a guide 417.

15 In use, the lower length of casing 420 is first secured by stops 431 on the rig floor in the usual manner. The gates 412 and 413 of the backup tong 403 are then opened. Since two of the four components 418 of the guide 417 are mounted on the gates 412 and 413 the guide 417 opens with the gates 412 and 413 so that the lower length of casing 420 can enter the backup tong 403 when the carriage 432 which supports the apparatus 400 is advanced towards the casing 420 on rails 433.

20 When the lower length of casing 420 is fully within the backup tong 403 the gates 412 and 413 are closed. The components 418 of the guide 417 have a stepped interior (not visible in Figure 12) so that the lower 25 part of each component 418 touches the socket on the top of the lower length of casing 420 whilst the upper part of the interior of each component 418 tapers inwardly to form a funnel. Once the lower length of casing 420 has been gripped the upper length of casing 428 is lowered 30 through the power tong 402 towards the lower length of casing 420. The guide 417 guides the pin on the bottom of the upper length of casing 428 into the socket. The power tong 402 is disposed a small distance above the guide 417. Once the pin of the upper length of casing 35 428 has entered the socket on the lower length of casing

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the jaws of the power tong 402 are applied to the upper length of casing 428 which is rotated until the joint reaches the desired torque. Thereafter, gates 404, 405, 412, 413 are opened and the assembly 400 retracted on 5 the carriage 432.

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Claims:-

1. An apparatus for aligning tubulars, which apparatus comprises a guide (117; 217; 317; 417) mounted on one of a power tong and a backup tong.
- 5 2. An apparatus as claimed in Claim 1, wherein said apparatus further comprises a socket centralizer (230; 330) mounted on said one of said power tong and said backup tong.
- 10 3. An apparatus as claimed in Claim 1 or 2, wherein said one of said power tong and said backup tong is said power tong (102; 202; 302).
- 15 4. An apparatus as claimed in Claim 1, wherein said apparatus comprises a power tong (102) and a backup tong (103), wherein said guide (117) is mounted on said power tong (102) and means (121, 123) are provided to maintain said power tong (102) and said backup tong (103) in a certain juxtaposition during a stabbing operation.
- 20 5. An apparatus as claimed in Claim 4, wherein said means (121, 123) comprises locating rods (121) on one of said power tong (102) and said backup tong (103) and blocks (123) shaped to receive at least the ends of said locating rods (121) on the other of said power tong (102) and said backup tong (103).
- 25 6. An apparatus as claimed in Claim 4 or 5, wherein said backup tong (103) is provided with at least two prismatic jaw assemblies (119) to locate said backup tong (103) in fixed juxtaposition with respect to a tubular being gripped.
- 30 7. A method for aligning tubulars, which method comprises the steps of aligning an upper tubular with a lower tubular with the use of the guide of an apparatus as claimed in Claim 3, raising said power tong, gripping said upper tubular and rotating said upper tubular to join said upper tubular to said lower tubular.
- 35 8. A method for aligning tubulars, which method

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comprises the steps of gripping a lower tubular provided with a socket with the backup tong of an apparatus as claimed in Claim 4, moving said power tong relative to said backup tong so that said means (121, 123) maintain 5 said power tong and said backup tong in said certain juxtaposition, lowering an upper tubular having a pin through said guide and allowing said pin to enter said socket, raising said power tong, gripping said upper tubular and rotating said upper tubular so that said pin 10 is screwed into said socket.

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FIG. 1a

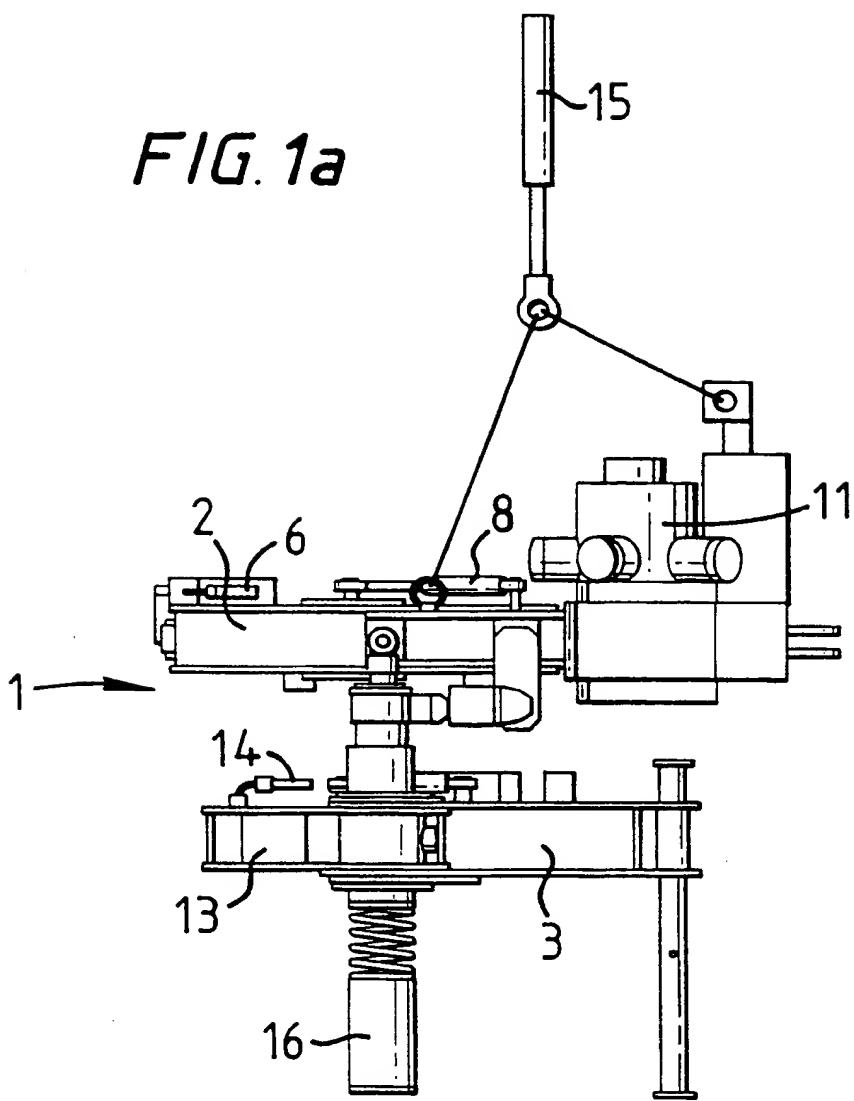
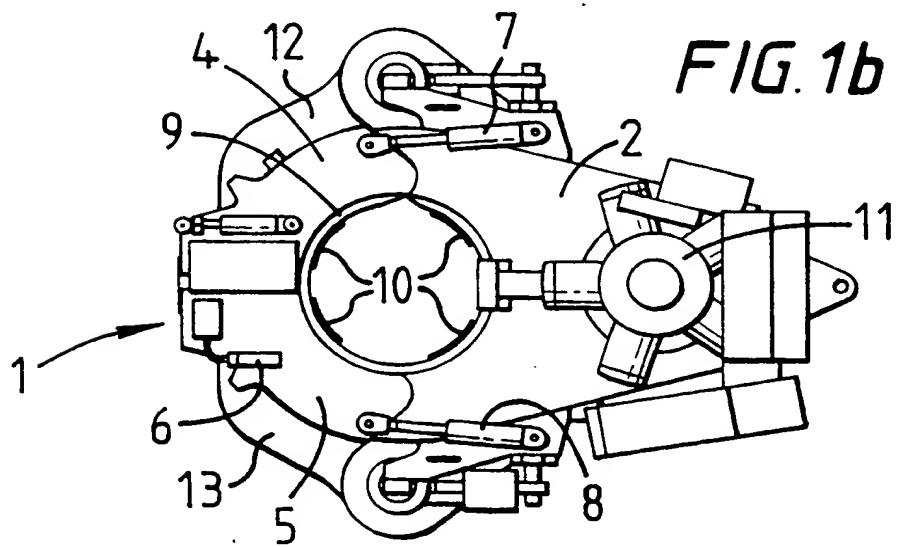


FIG. 1b



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FIG. 2a

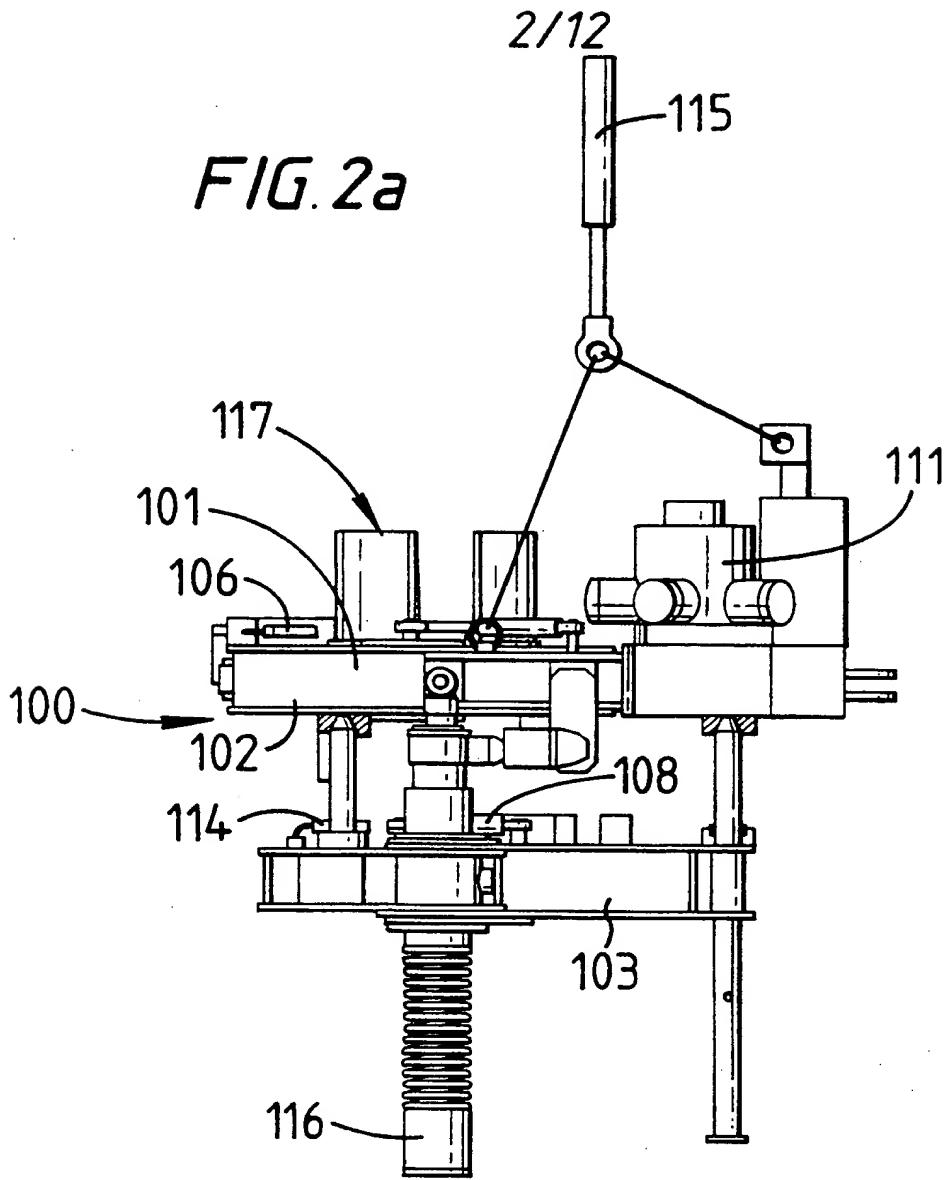
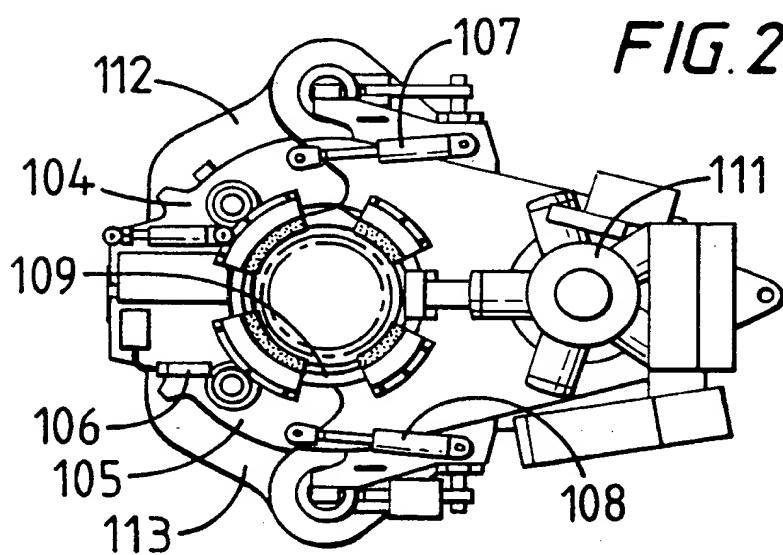


FIG. 2b



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FIG. 3a

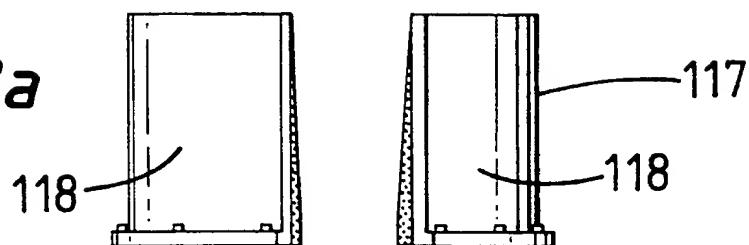


FIG. 3b

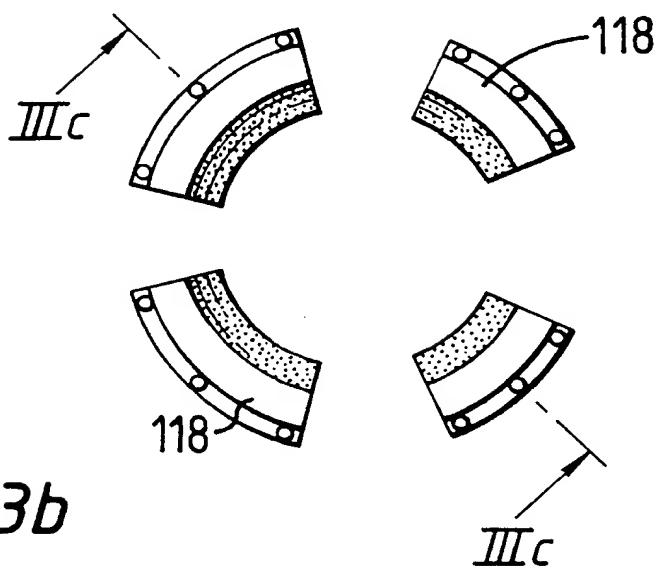
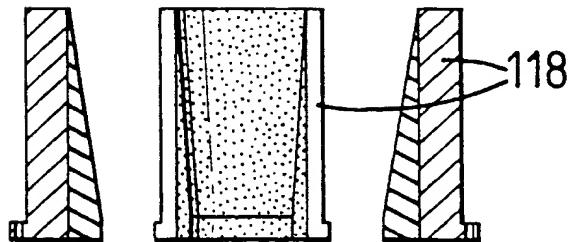


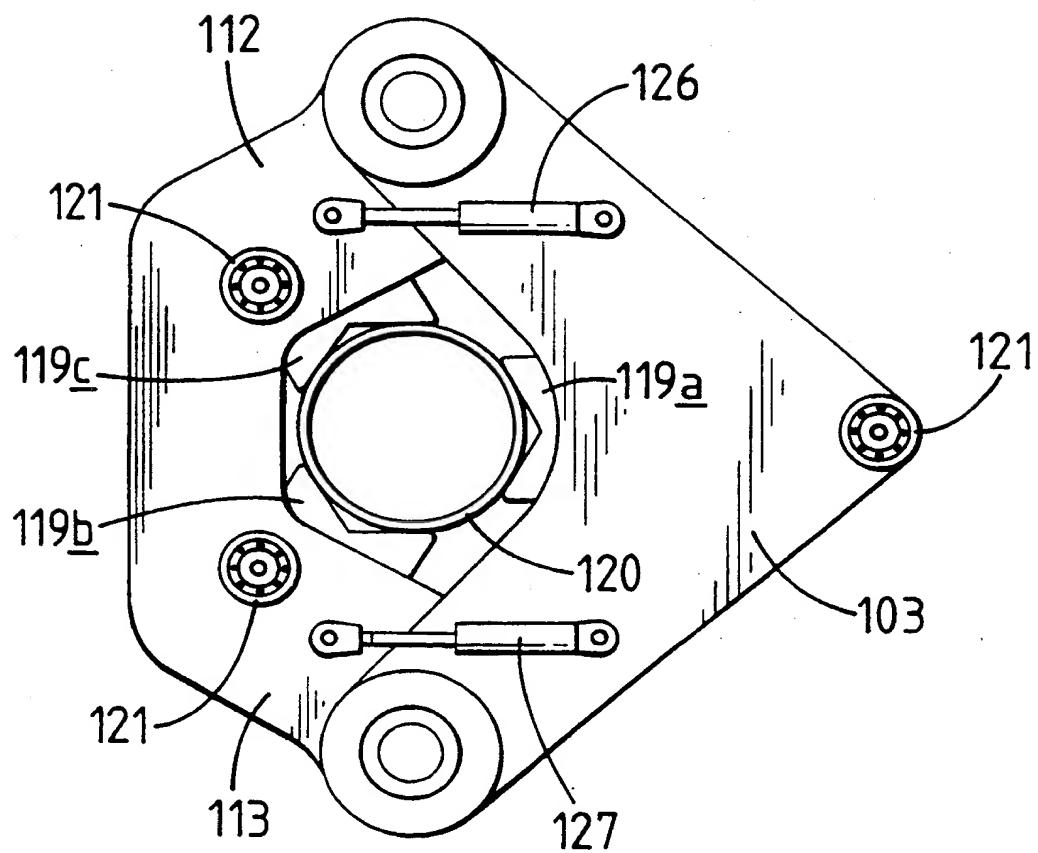
FIG. 3c



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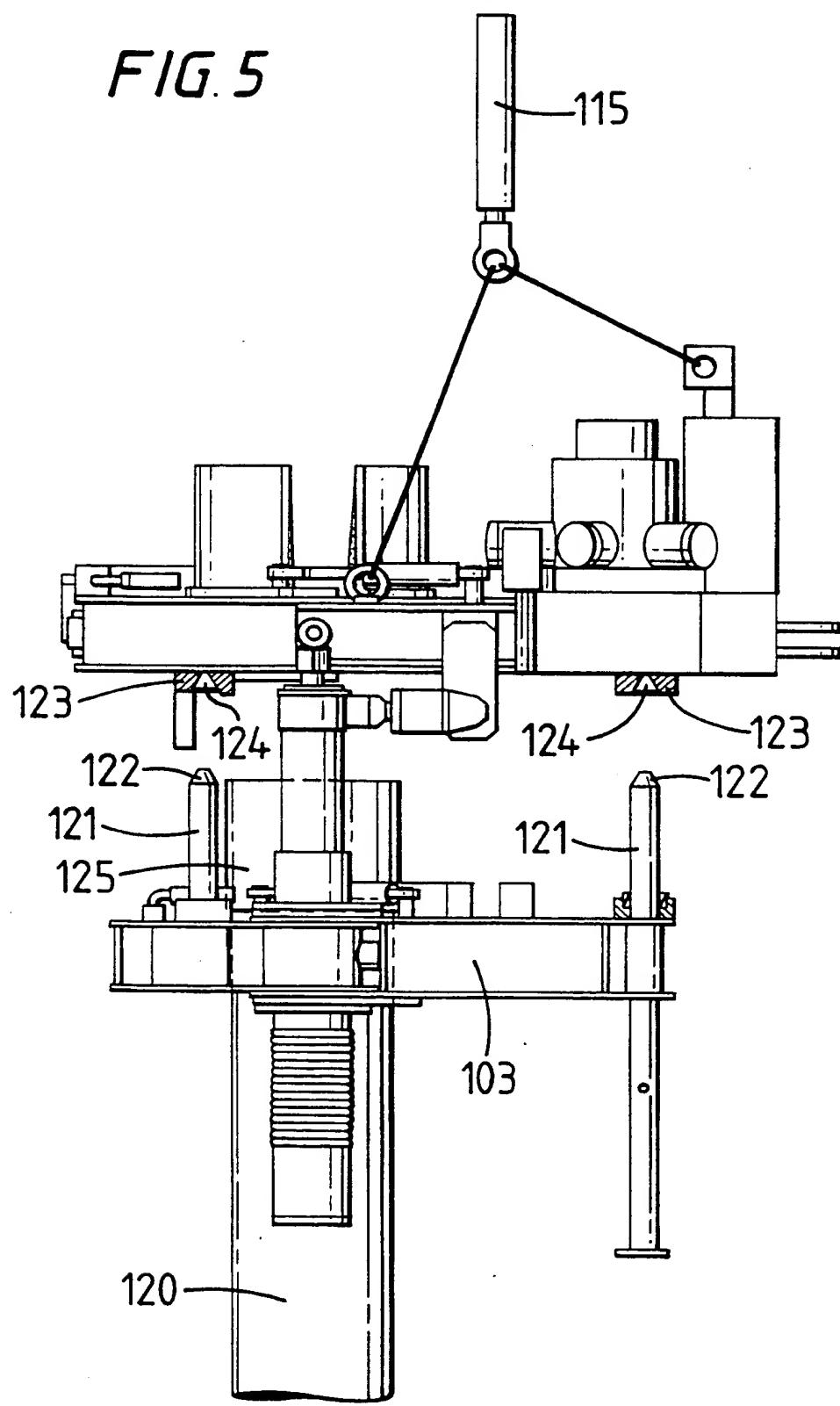
FIG. 4



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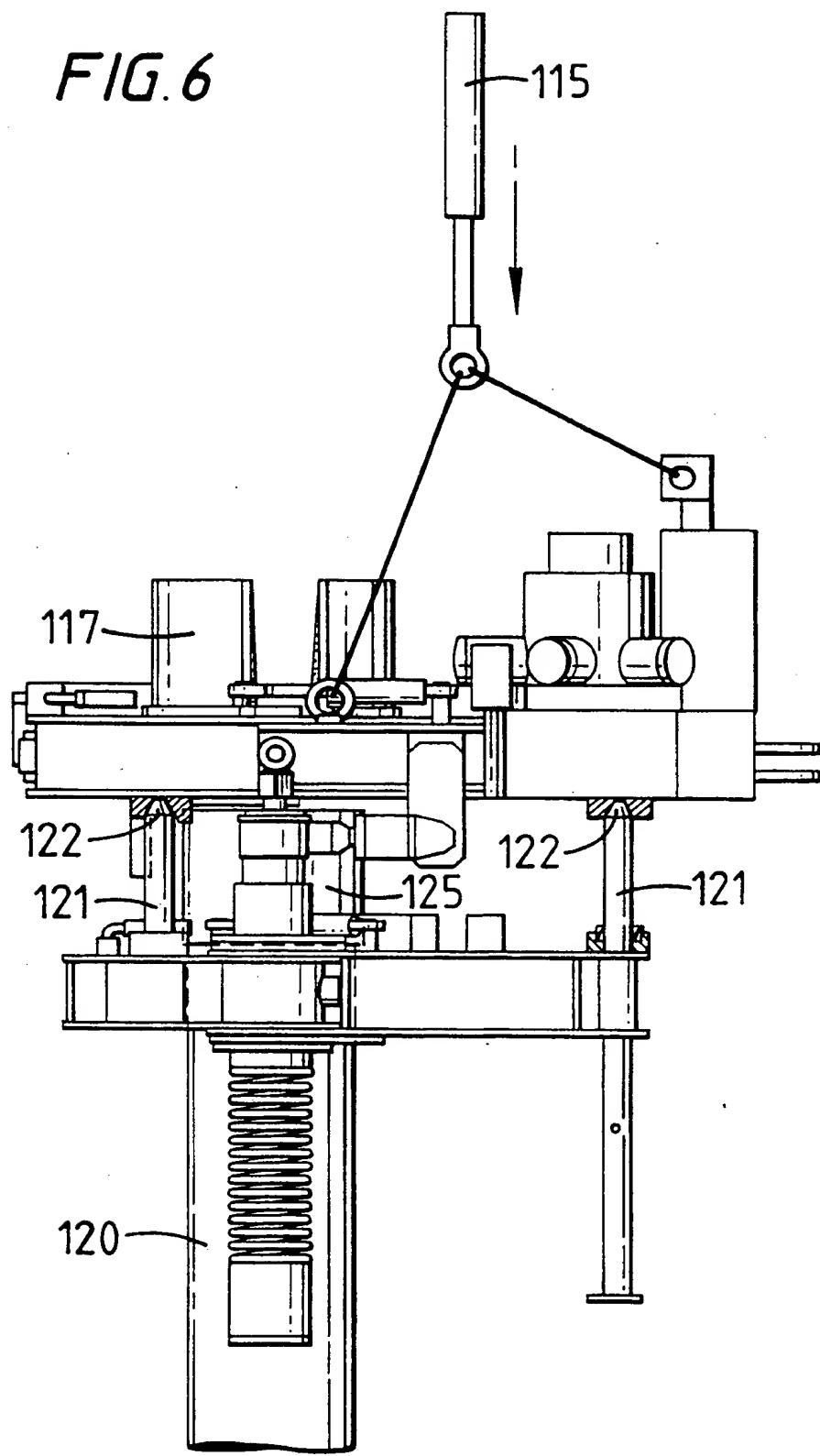
FIG. 5



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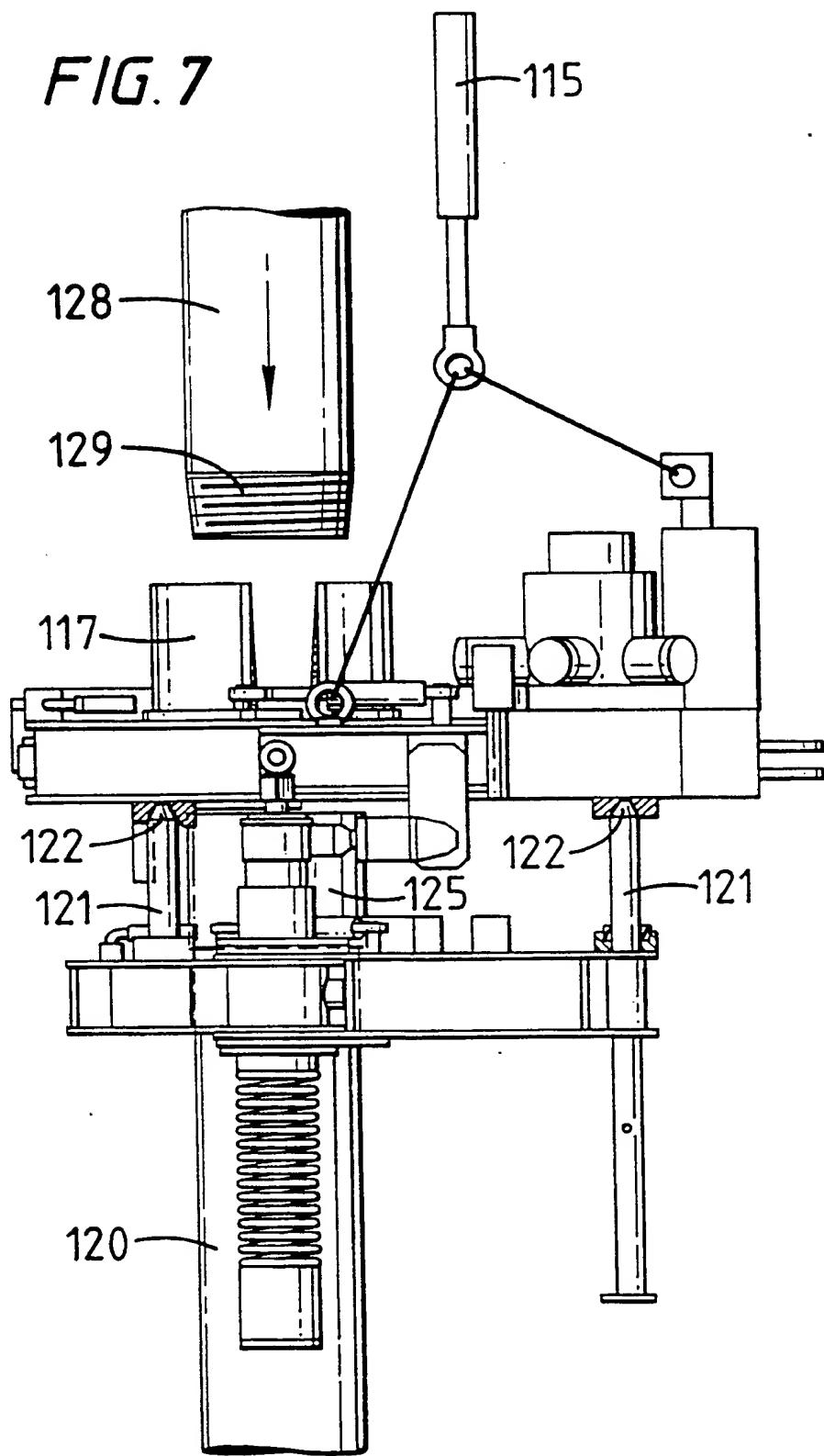
FIG. 6



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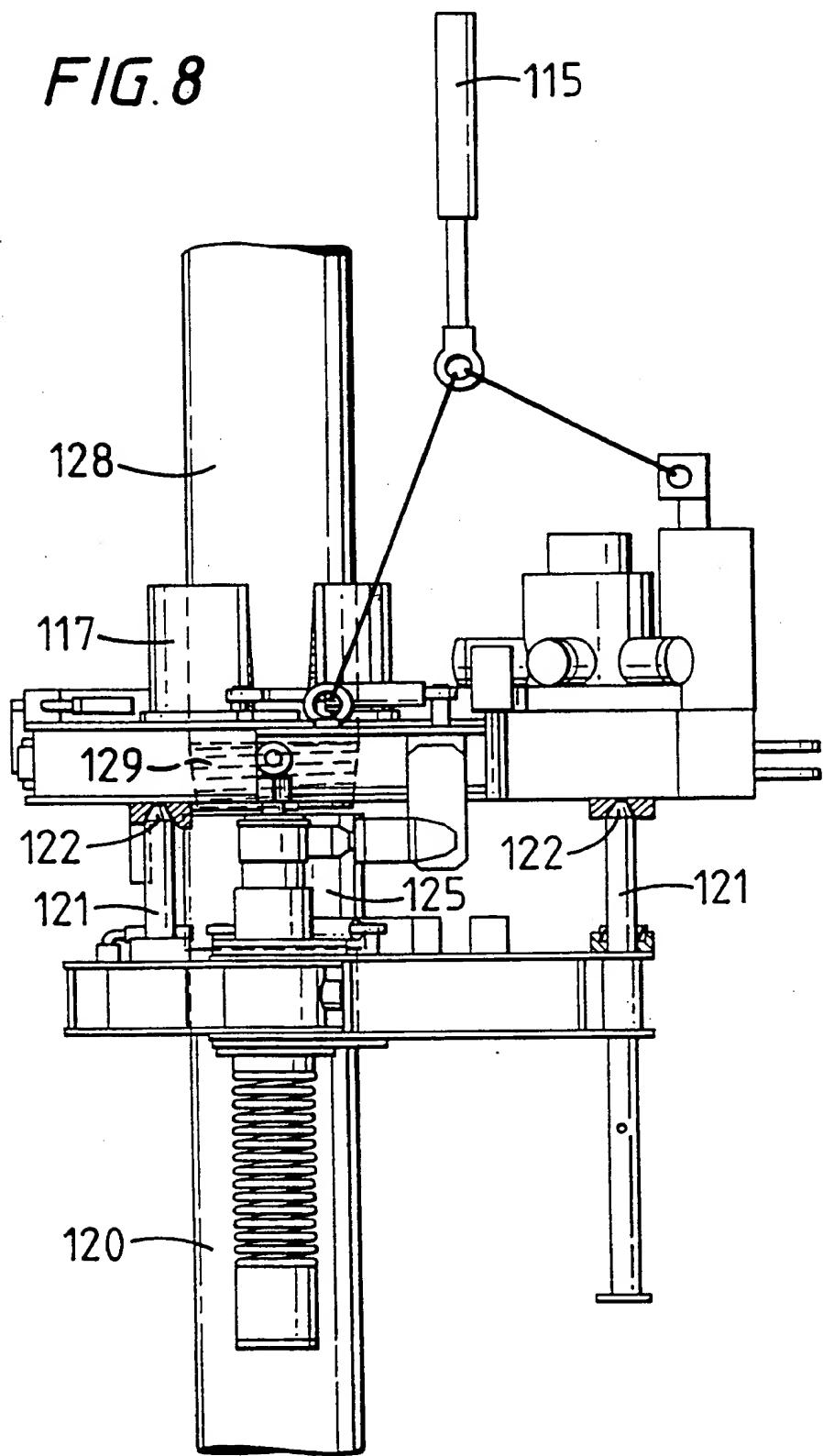
FIG. 7



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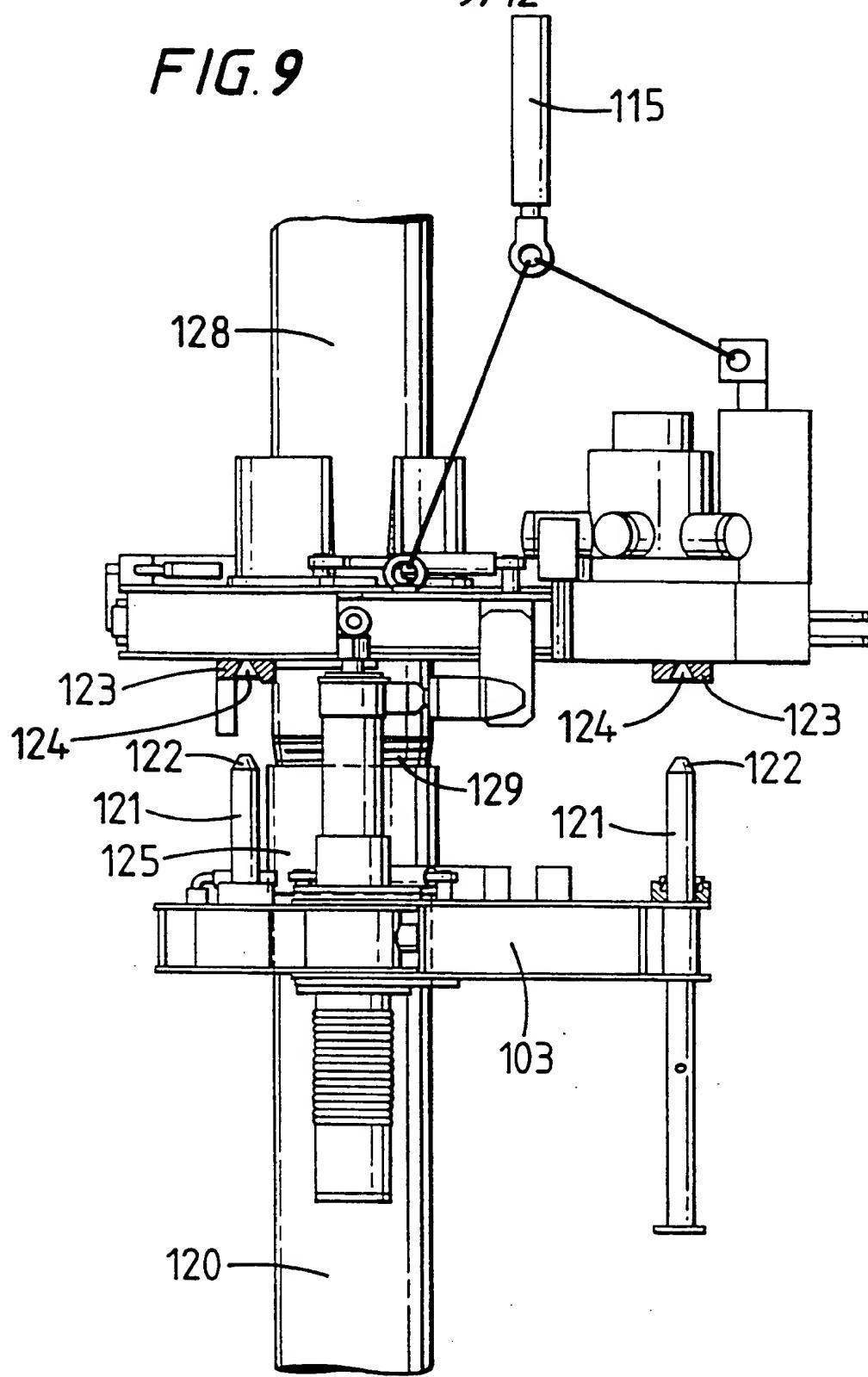
FIG. 8



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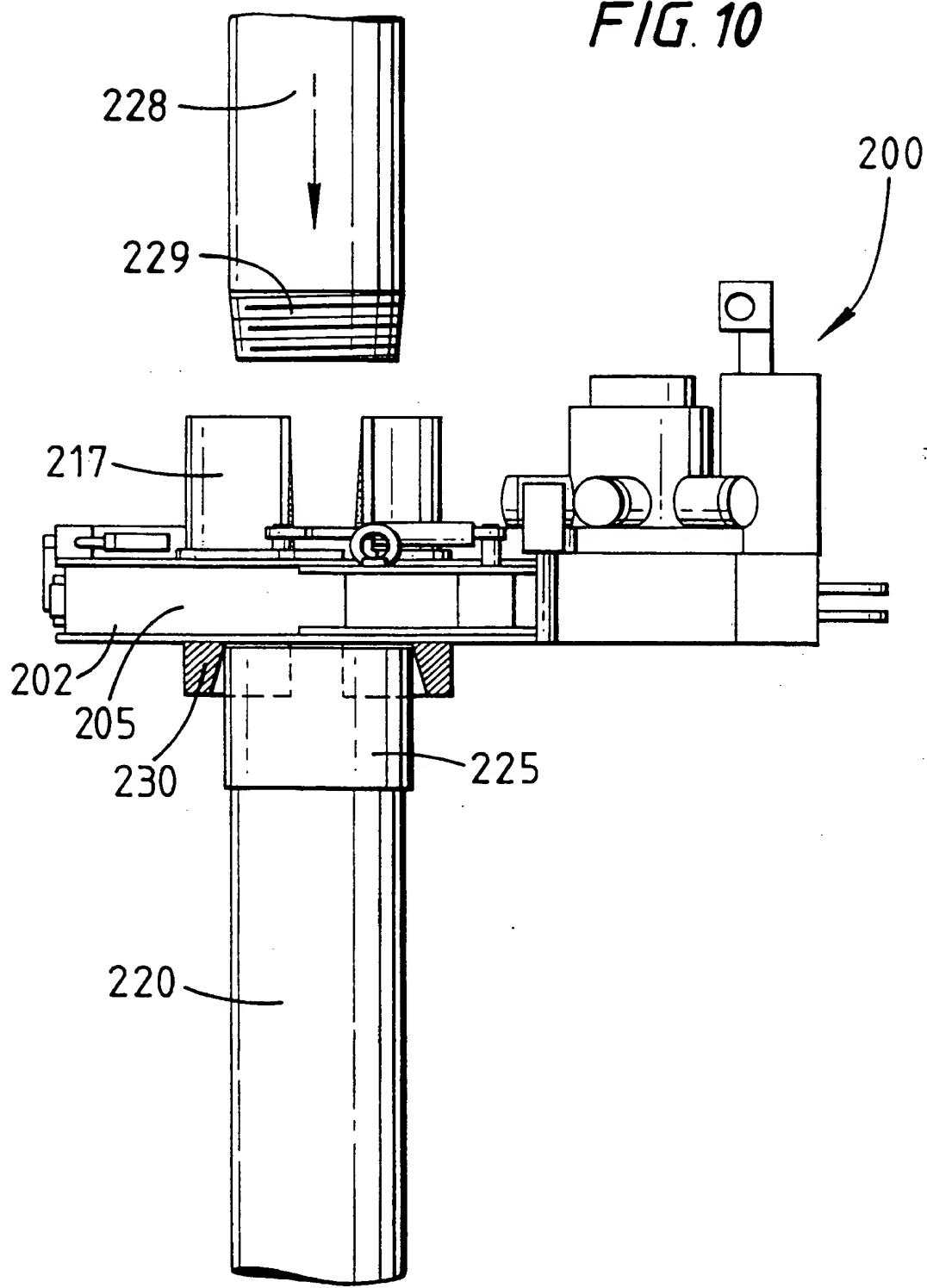
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FIG. 9



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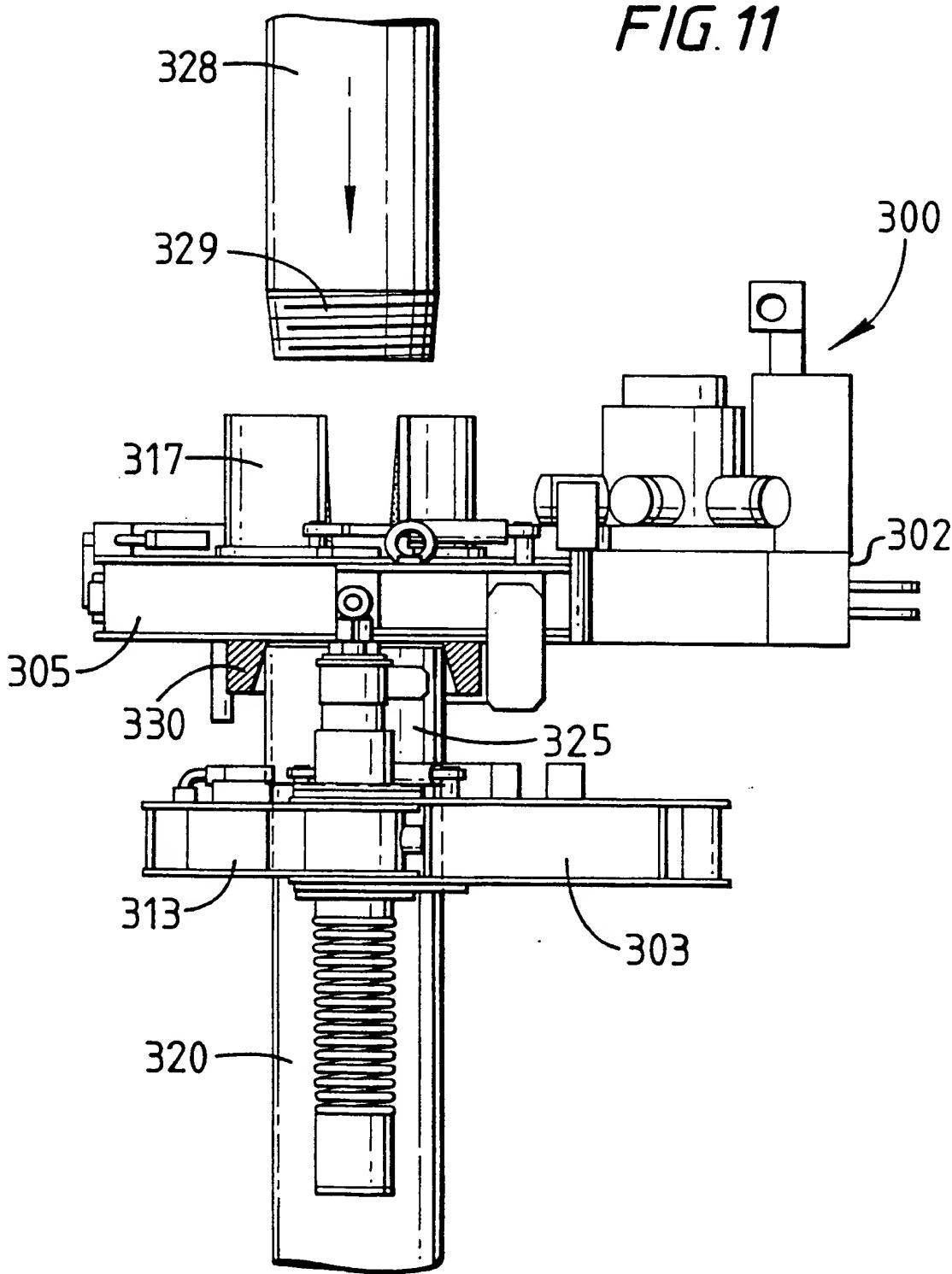
FIG. 10



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FIG. 11



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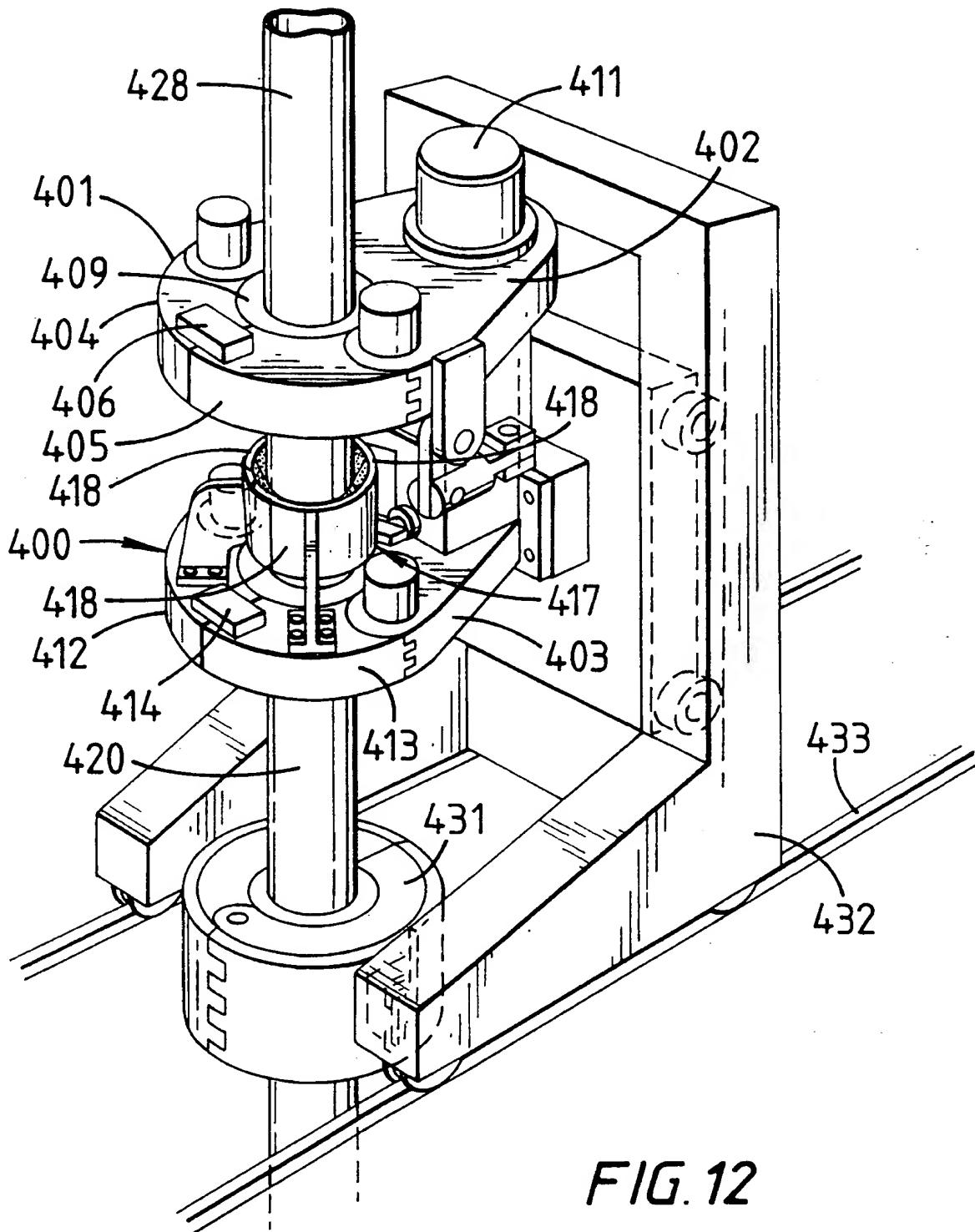


FIG. 12

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INTERNATIONAL SEARCH REPORT

International Application No

GB 98/00282

A. CLASSIFICATION OF SUBJECT MATTER

IPC 6 E21B19/16

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 6 E21B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 3 881 375 A (KELLY ROBERT R) 6 May 1975	1,3,4
Y	see column 1, line 11 - line 22; figures 1,2	2,6
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	see abstract; figures	
X	US 3 635 105 A (DICKMANN JOHN L ET AL) 18 January 1972	1,3
Y	see column 3, line 65 - column 4, line 7; figures 3-5	6
X	US 3 589 742 A (FLICK HOWARD S) 29 June 1971	1,3
	see column 1, line 5 - line 11; figures 3,6	
	see column 3, line 6 - line 20; figure 3	

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Further documents are listed in the continuation of box C.

Patent family members are listed in annex.

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"&" document member of the same patent family

Date of the actual completion of the international search

Date of mailing of the international search report

8 May 1998

15/05/1998

Name and mailing address of the ISA

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Weiand, T

INTERNATIONAL SEARCH REPORT

Serial Application No

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C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

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